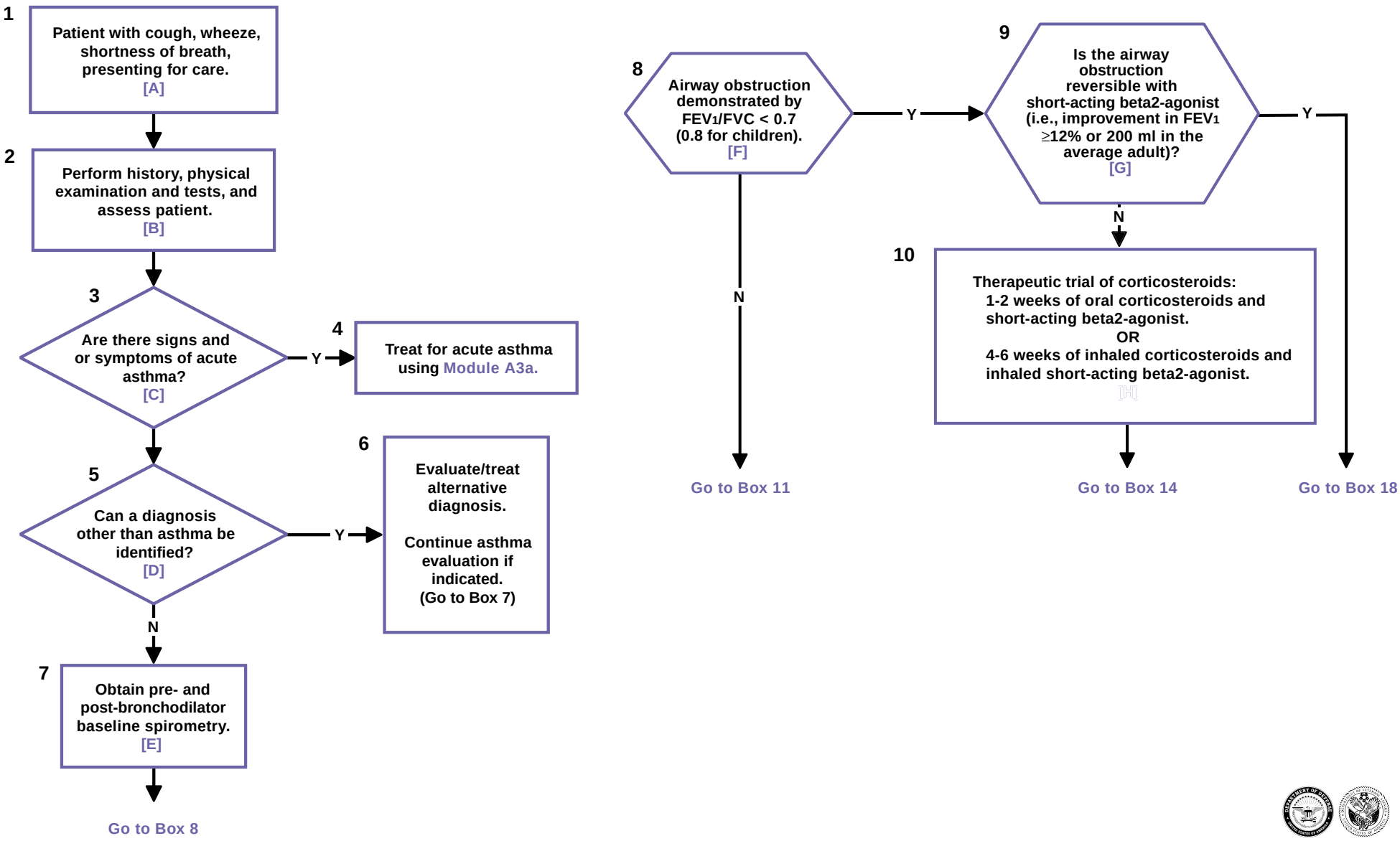
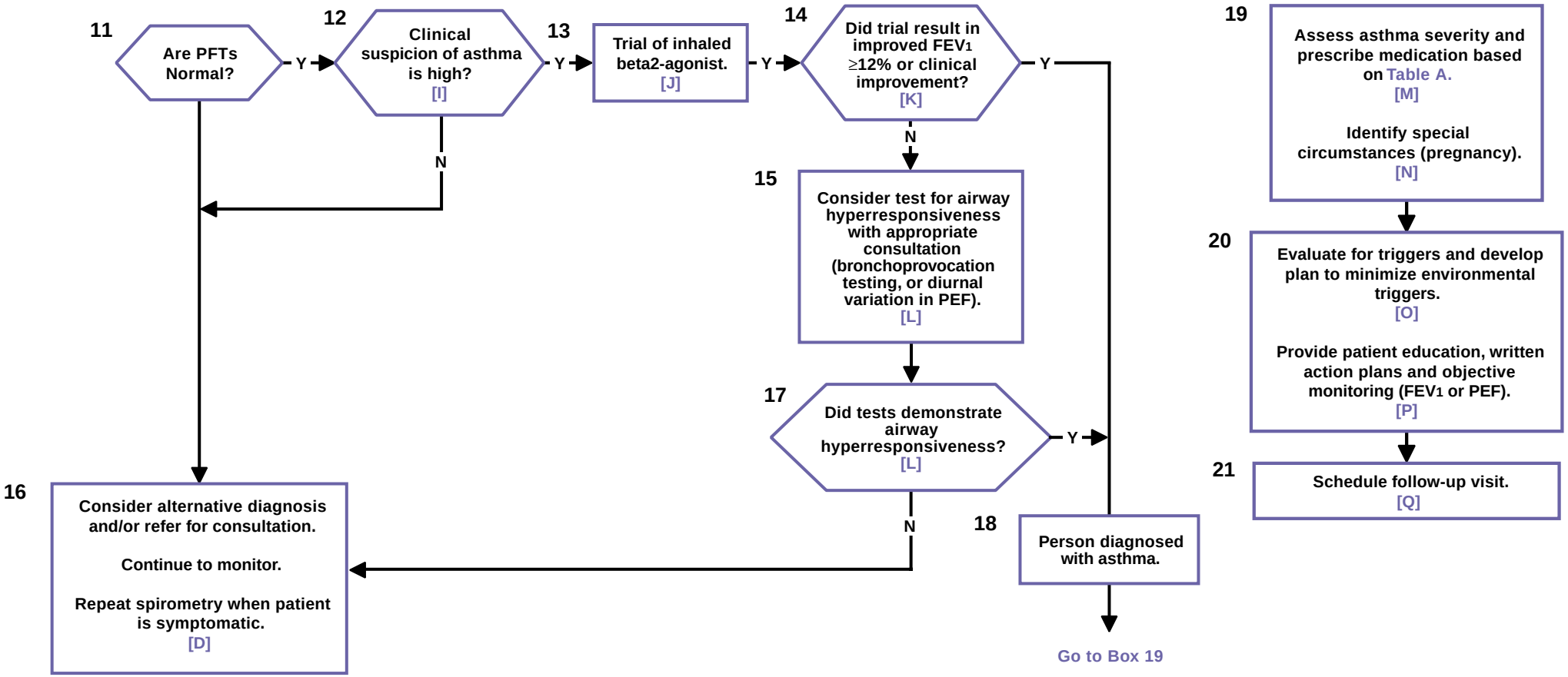
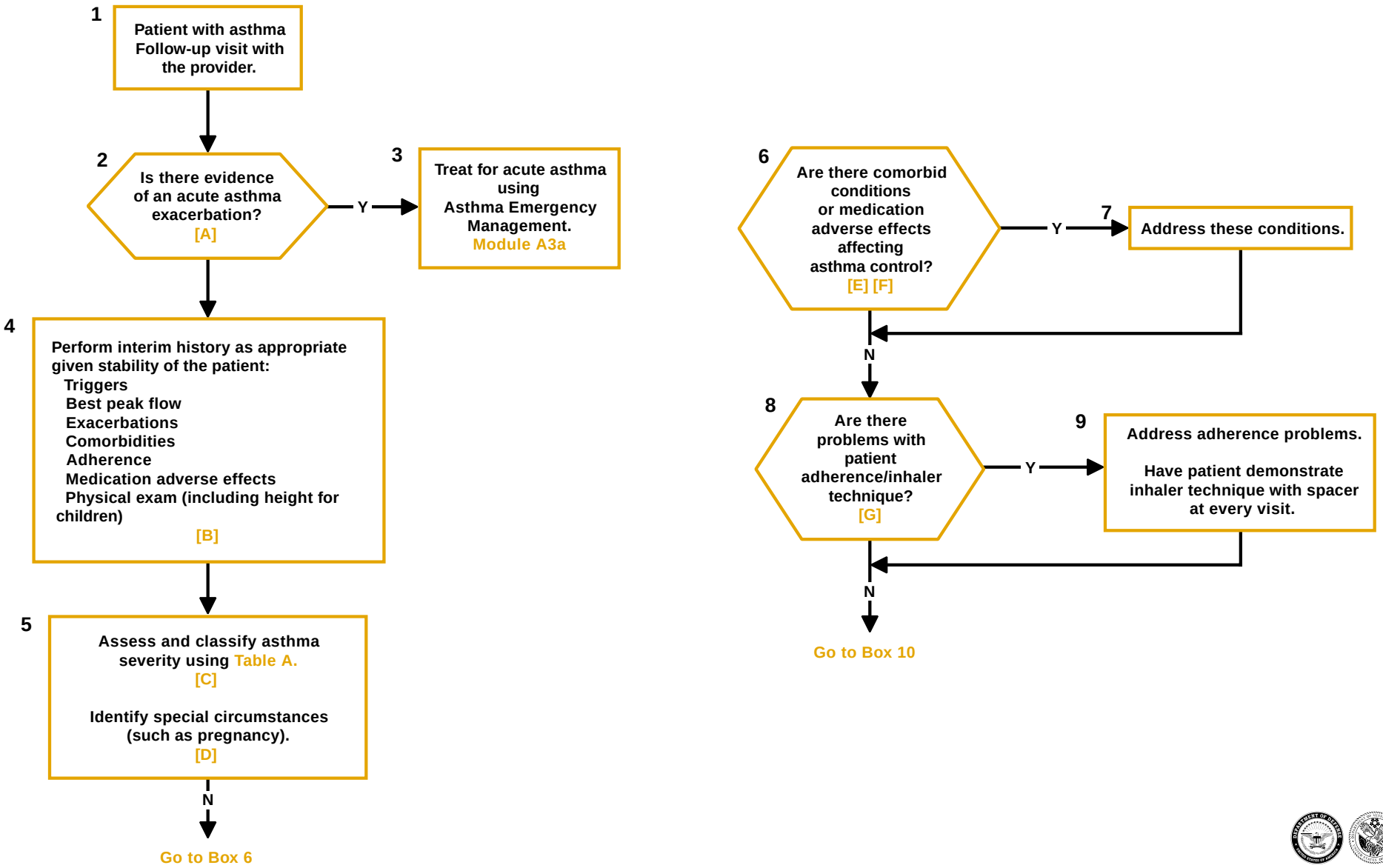
Algorithm A1a:
Asthma Diagnosis and Initial Management for Adults and Children Age 6 Years and Over



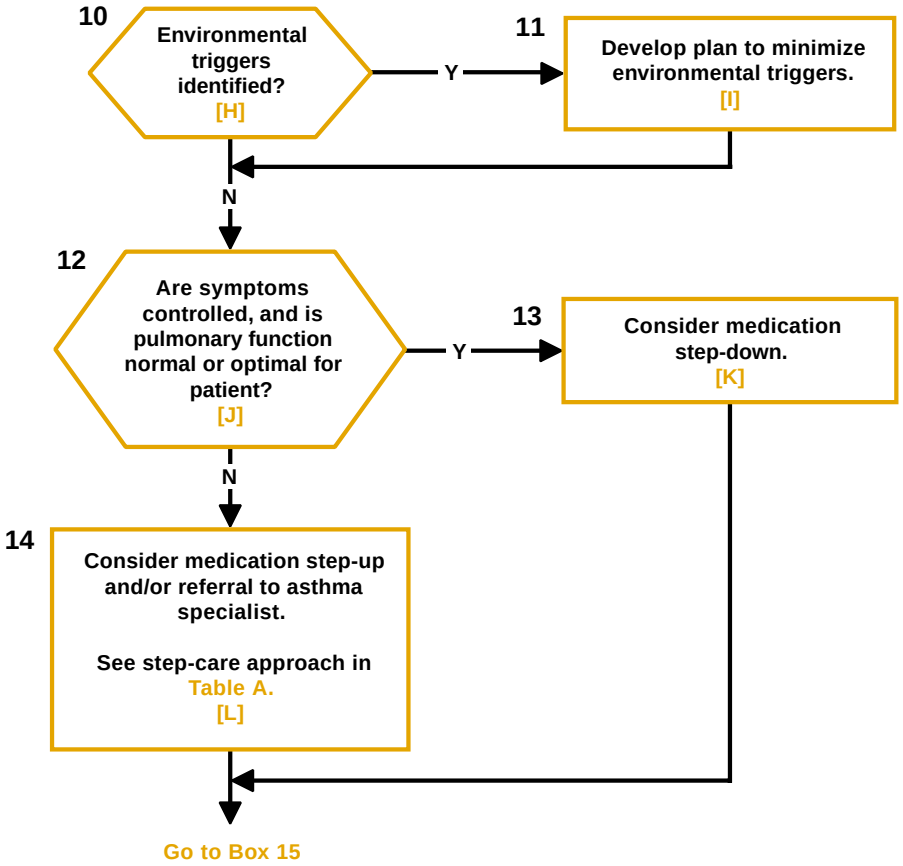
Algorithm A1a: (cont.)
Asthma Diagnosis and Initial Management
for Adults and Children Age 6 Years and Over

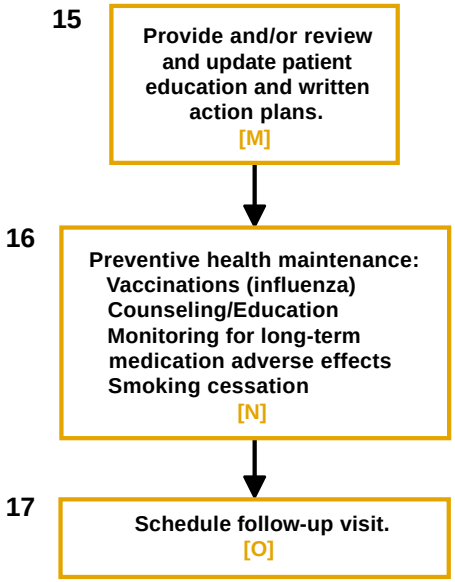


Algorithm A2a:
Asthma Treatment Follow-up Management for Adults and Children Age 6 Years and Over



Algorithm A2a: (cont.)
Asthma Treatment Follow-up Management
for Adults and Children Age 6 Years and Over





DoD/VA Asthma Clinical Practice Guideline
PROVIDER REFERENCE CARD

Key Elements

Initial Diagnosis:

- Consider asthma in the differential diagnosis of any patient who presents with persistent respiratory problems
- Use spirometry to help make the diagnosis for children over 6 years-old
- Use trials of asthma medication to determine response to asthma therapy as an aid to diagnosis

Follow-up Visits/Long Term Asthma Management

- Classify asthma severity
  - Use NHLBI standards (mild intermittent: mild, moderate, and severe persistent)
  - Use objective measures of airways obstruction (peak flow, spirometry) to determine asthma severity
  - Use patient report of symptoms to help classify asthma severity
- Treat patient based on asthma severity classification
  - Provide/adjust quick reliever and long-term controller medications to attain optimal control of the patient's asthma
  - Long term controller medications are needed for mild persistent, moderate persistent and severe persistent asthma
- Educate patients concerning their asthma
  - Educate patients about the role of reliever and controller medications
  - Educate appropriate patients on how to self-monitor their asthma with a peak flow meter
  - Educate patients on signs/symptoms of worsening asthma
  - Educate patients on when and how to contact their primary care manager (PCM)
  - Provide a written action plan
- Preventive maintenance/trigger avoidance
  - Assess triggers and institute environmental controls when indicated
  - Vaccinate against influenza
  - Provide smoking cessation information when appropriate
- Provide follow-up on regular basis and ensure that the patient has a PCM

Emergency Management of Asthma Exacerbations:

- Use objective measures to assess airways obstruction/ exacerbation severity
- Pulse oximetry
- Peak flow or FEV_1
- Treat promptly with corticosteroids and short acting, inhaled $beta_2$-agonists
- Assess response to therapy using objective measures as well as clinical exam
- Discharge patient with appropriate education, written instructions, and follow-up

Telephone Triage:

- Assess the severity of the asthma exacerbation
- Patients with severe exacerbations should NOT be managed at home
- Review the patient's action plan and set up appropriate follow-up

Table A. Step-Care Approach for Prescribing Asthma Medications Based on Severity–Adult

Severity Level	Signs/Symptoms	Nocturnal Symptoms	Lung Function	Drug Therapy
Mild Intermittent (493.00x1)*	• Symptoms ≤ 2 times/week • Exacerbations brief • Asymptomatic/normal PEF between exacerbations	≤ 2 times/month	FEV_1 or PEF ≥ 80% predicted PEF variability < 20%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Usually no daily medication needed
Mild Persistent (493.00x2)	• Symptoms > 2 times/week but < 1 time/day • Exacerbations can affect activity	> 2 times/month	FEV_1 or PEF ≥ 80% predicted PEF variability 20–30%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (LOW dose) • May also consider theophyline SR, leukotriene modifier, cromolyn, or nedocromil • For patients with ASA sensitive asthma, consider using leukotriene modifiers
Moderate Persistent (493.00x3)	• Symptoms daily • Exacerbations ≥ 2 times/week and affect activity • Daily use of quick relief medications	> 1 time/week	FEV_1 or PEF ≥ 60% < 80% predicted PEF variability > 30%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (MEDIUM dose) *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and inhaled long-acting $beta_2$-agonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and theophyline • Consider referral
Severe Persistent (493.00x4)	• Symptoms continuous • Limited physical activity • Exacerbations frequent	Frequent	FEV_1 or PEF < 60% predicted PEF variability > 30%	***Quick Relief*** • Inhaled short-acting $beta_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (HIGH dose) and inhaled long-acting $beta_2$-agonist *or* • Inhaled corticosteroid (HIGH dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (HIGH dose) and theophyline • Oral corticosteroids may be indicated • Consider referral
(493.11)	Asthma with status asthmaticus			

** ICD-9 Code/MEDCOM Asthma Extender Code*

PROVIDER REFERENCE CARD

MEDICATION TABLE–Adult and Children Age 6 Years and Over:

Estimated Comparative Daily Dosages for Inhaled Corticosteroids

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1a) Page 15; Management of Asthma: Annotations (A2a) Page 18

Drug	Low-Dose	Medium-Dose	High-Dose
Beclomethasone dipropionate 42 mcg/puff 84 mcg/puff	168 - 504 mcg (4 - 12 puffs) (2 - 6 puffs)	504 - 840 mcg (12 - 20 puffs) (6 - 10 puffs)	> 840 mcg (> 20 puffs) (> 10 puffs)
Budesonide Turbuhaler 200 mcg/dose	200 - 400 mcg (1 - 2 inhalations)	400 - 600 mcg (2 - 3 inhalations)	>600 mcg (> 3 inhalations)
Flunisolide 250 mcg/puff	500 - 1,000 mcg (2 - 4 puffs)	1,000 - 2,000 mcg (4 - 8 puffs)	> 2,000 mcg (> 8 puffs)
Fluticasone MDI: 44, 110, 220 mcg/puff Dry powder inhaler (DPI): 50, 100, 250 mcg/puff	88 - 264 mcg	264 - 660 mcg	> 660 mcg (> 6 inhalations - 100 mcg) or (>2 inhalations - 250 mcg)
Triamcinolone acetonide 100 mcg/puff	400 - 1,000 mcg (4 - 10 puffs)	1,000 - 2,000 mcg (10 - 20 puffs)	> 2,000 mcg (> 20 puffs)

TABLE: Leukotriene Modifiers

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1a) Page 16

Drug	Dosage Form	Dose	Age Approval Use	LFT Required
Montelukast	5 mg tab 10 mg tab	Children (6 - 14 yrs) 5 mg qhs Adults (> 14 yrs) 10 mg qhs	6 yrs	
Zafirlukast	20 mg tabs	20 mg bid (Take on empty stomach)	12 yrs	
Zileuton	600 mg tabs	600 mg qid	12 yrs	Baseline or periodic (e.g., q month x 3 months) and then (e.g., q 2 - 3 months x 1 year)

MEDICATION TABLE–Adult and Children Age 6 Years and Over: (cont.)

Medication Doses (Adapted from the NAEPP EPR - 2 1997)

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A3a) Page 8

Medications	Children's Dose (over 6 years)	Comments
Inhaled short-acting beta$_2$-agonists		
Albuterol:	4 to 8 puffs every 20 minutes (or 24 puffs per hour) then	As effective as nebulized therapy if patient is able to
Metered dose inhaler (MDI)	1 - 4 hours as needed	coordinate inhalation maneuver
(90 mcg/puff) with spacer/holding chamber	2.5 mg to 5 mg every 20 minutes for 3 doses, then 2.5	
Nebulizer solution:	to 10 mg every 1 - 4 hours as needed or 10 - 30 mg/hour	Only selective beta$_2$-agonists are recommended. For optimal
(5 mg/ml)	continuously	delivery, dilute aerosols to minimum of 4 ml at gas flow of 6 to 8 L/minute
Systemic (subcutaneous) beta$_2$-agonists		
Epinephrine: 1:1000	0.3 - 0.5 mg every 20 minutes for 3 doses subcutaneously	No proven advantage of systemic therapy over aerosol. May
(1 mg/ml)		be hazardous in patients with coronary artery disease.
Anticholinergics		
Ipratropium bromide:		
MDI (18 mcg/ml)	4 - 8 puffs as necessary	Dose delivered from MDI is low and has not been studied in asthma exacerbations.
Nebulizer solution:		
(0.25 mg/ml; 0.5 mg/vial)	0.5 mg every 30 minutes for 3 doses then every 2 to 4 hours as needed	May mix in same nebulizer with albuterol. Should not be used as first line therapy; may be added to beta$_2$-agonist therapy.
Corticosteroids		
Prednisone	120 - 240 mg/day in 3 or 4 divided doses for 48 hours,	For outpatient "burst," use 40 - 60 mg/day (approximately 2
Methylprednisolone	then 60 - 80 mg/day until PEF reaches 60% of predicted	mg/kg/day) in single or two divided doses for 3 - 10 days
Prednisolone	value or personal best. (See Discussion)	(See Discussion)

Proposed Asthma Metrics

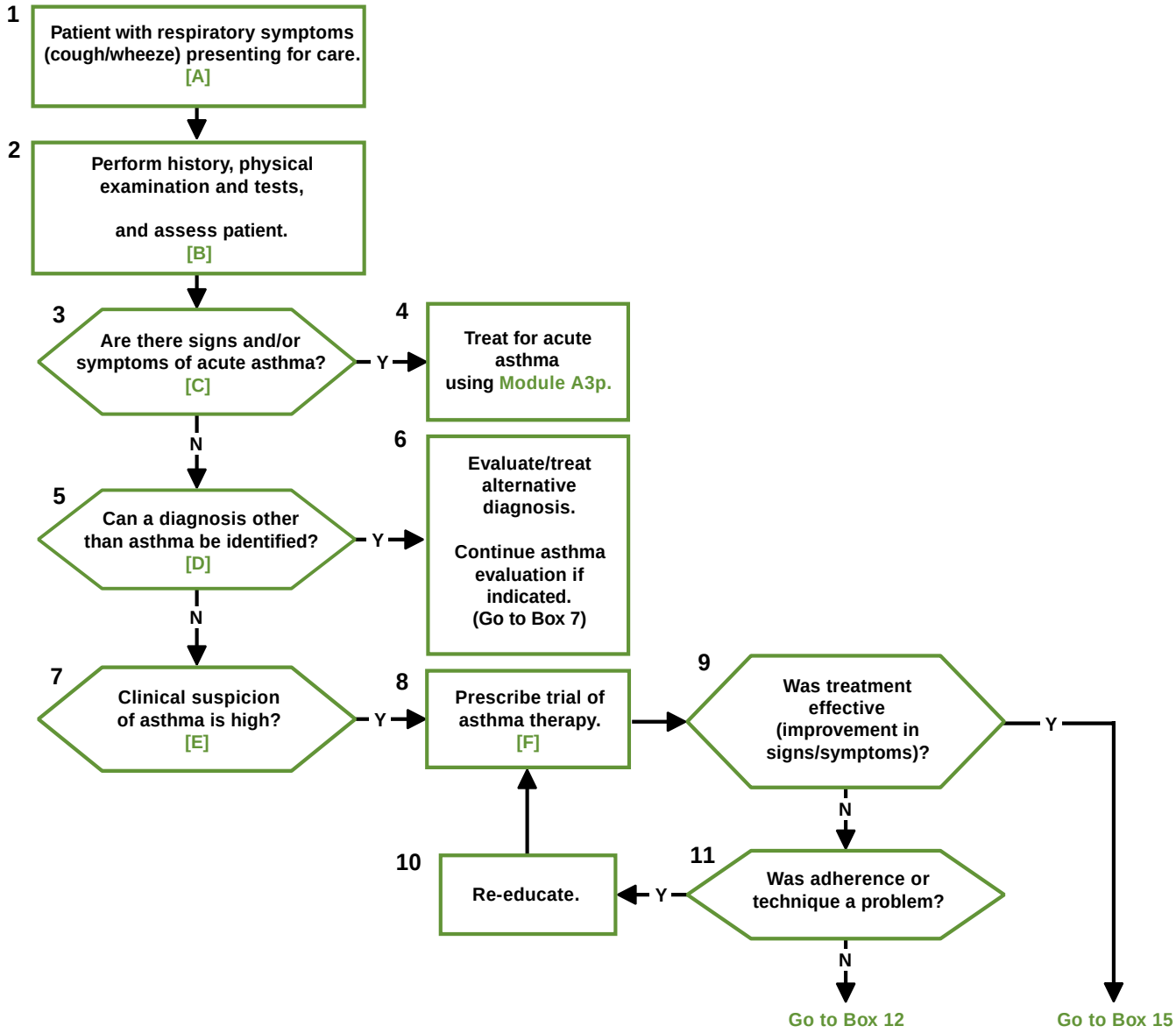
Percentage of asthma visits with documented asthma severity level.

Percentage of patients with persistent asthma who are prescribed long-term controllers.

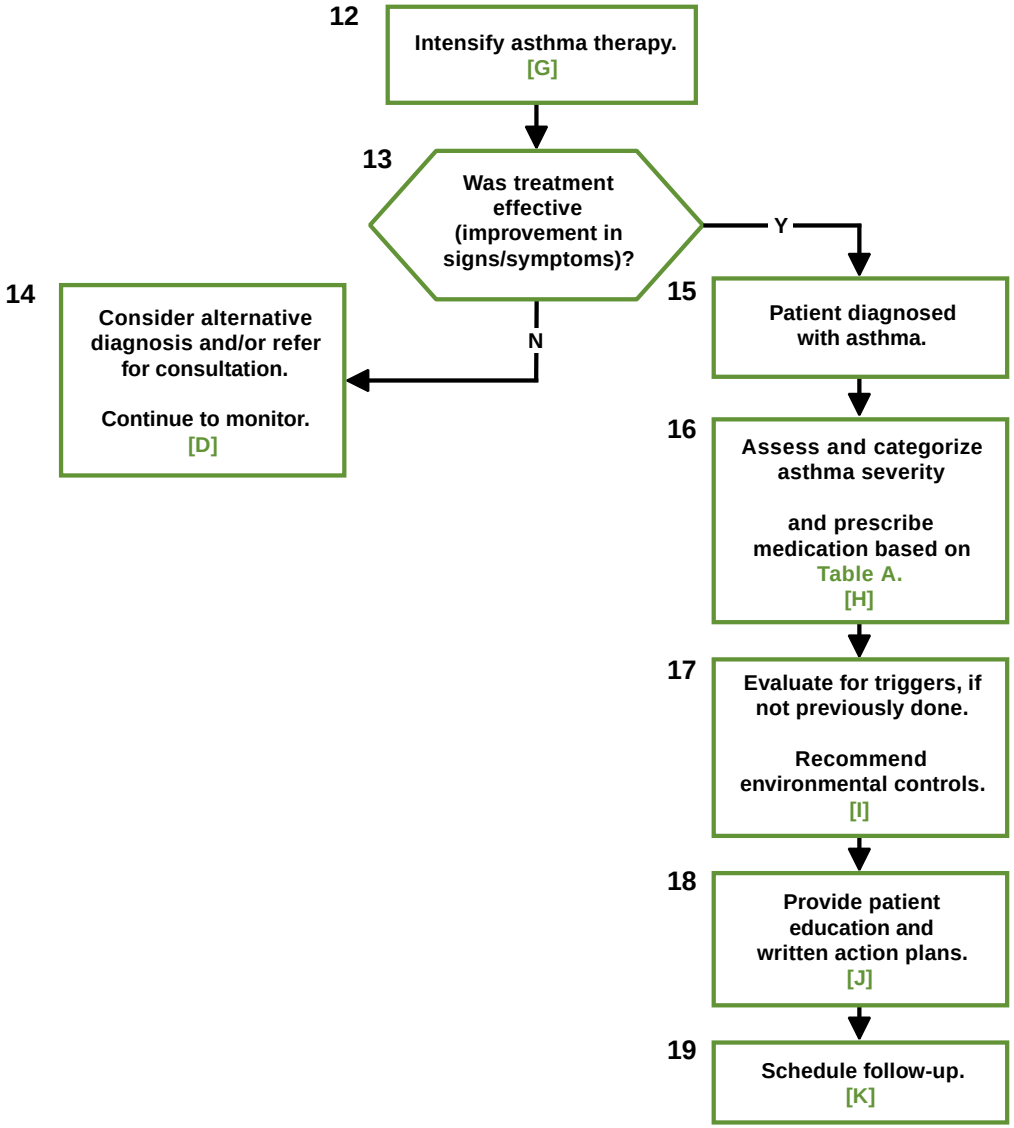
Percentage of asthmatics 6 and over with spirometry in past 12 months.

Percentage of patients with persistent asthma with written action plan documented in the past 12 months.

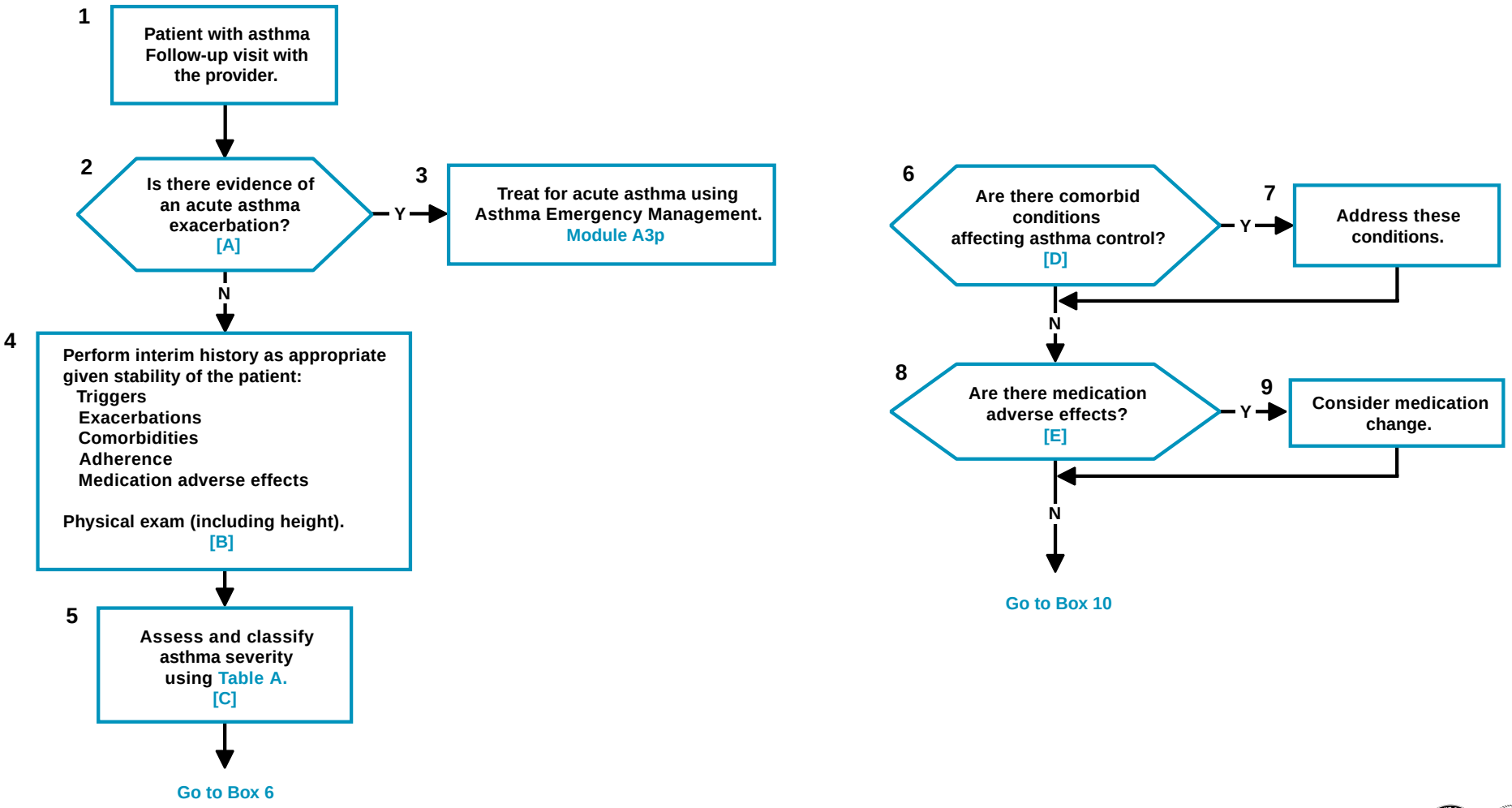
Algorithm A1p:
Asthma Diagnosis and Initial Management for Infants and Children Under 6 Years Old Who Cannot Perform Spirometry



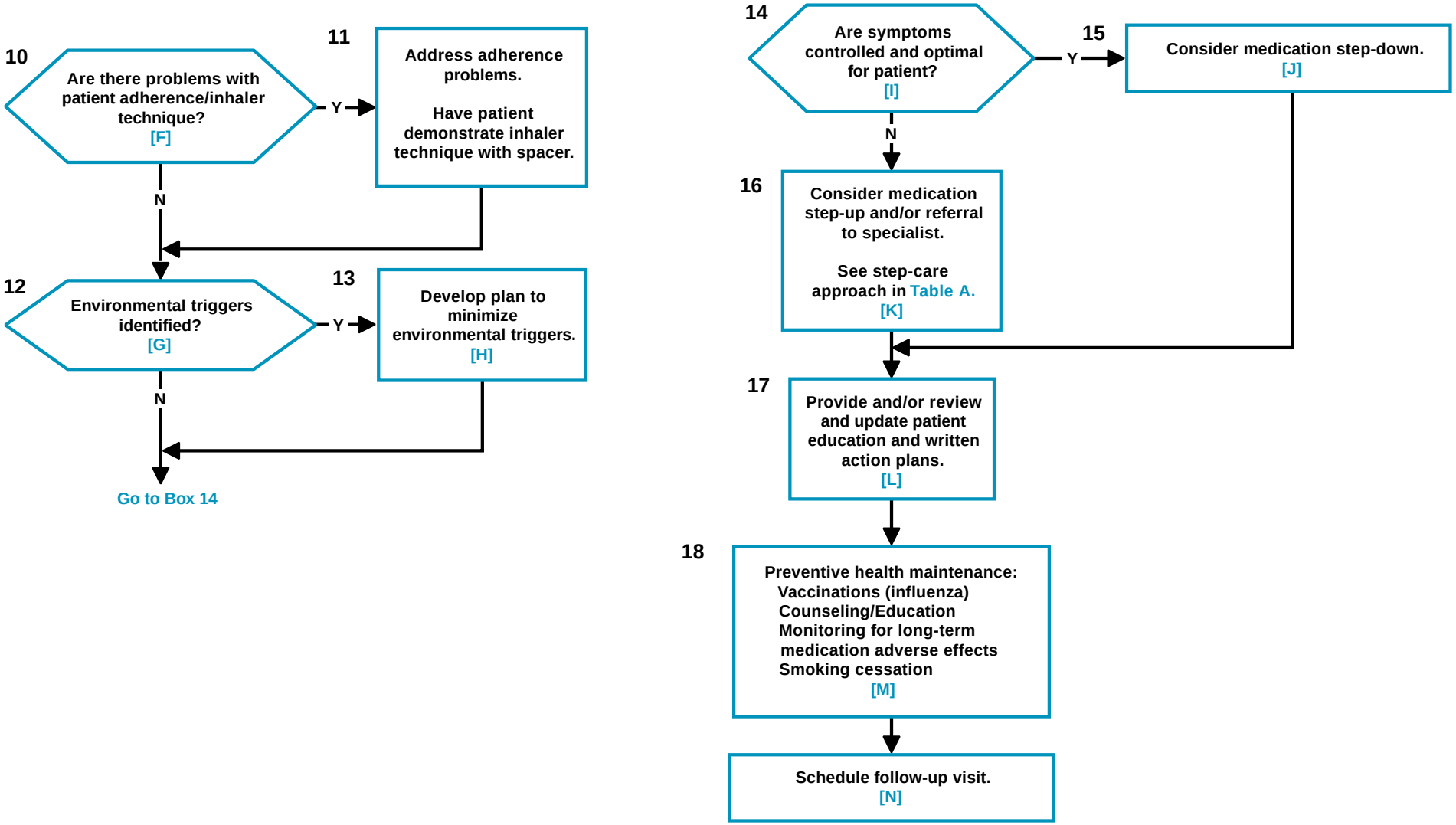
Algorithm A1p: (cont.)
Asthma Diagnosis and Initial Management for Infants and Children Under 6 Years Old Who Cannot Perform Spirometry



Algorithm A2p:
Asthma Treatment Follow-up Management for Children Under Age 6 Who Cannot Perform Spirometry



Algorithm A2p: (cont.)
Asthma Treatment Follow-up Management for Children Under Age 6



DoD/VA Asthma Clinical Practice Guideline
PROVIDER REFERENCE CARD
Key Elements

Initial Diagnosis:

- Consider asthma in the differential diagnosis of any patient who presents with persistent respiratory problems
- Use spirometry to help make the diagnosis for children over 6 years-old
- Use trials of asthma medication to determine response to asthma therapy as an aid to diagnosis

Follow-up Visits/Long Term Asthma Management

- Classify asthma severity
  - Use NHLBI standards (mild intermittent: mild, moderate, and severe persistent)
  - Use objective measures of airways obstruction (peak flow, spirometry) to determine asthma severity
  - Use patient report of symptoms to help classify asthma severity
- Treat patient based on asthma severity classification
  - Provide/adjust quick reliever and long-term controller medications to attain optimal control of the patient's asthma
  - Long term controller medications are needed for mild persistent, moderate persistent and severe persistent asthma
- Educate patients concerning their asthma
  - Educate patients about the role of reliever and controller medications
  - Educate appropriate patients on how to self-monitor their asthma with a peak flow meter
  - Educate patients on signs/symptoms of worsening asthma
  - Educate patients on when and how to contact their primary care manager (PCM)
  - Provide a written action plan
- Preventive maintenance/trigger avoidance
  - Assess triggers and institute environmental controls when indicated
  - Vaccinate against influenza
  - Provide smoking cessation information when appropriate
- Provide follow-up on regular basis and ensure that the patient has a PCM

Emergency Management of Asthma Exacerbations:

- Use objective measures to assess airways obstruction/ exacerbation severity
- Pulse oximetry
- Peak flow or FEV_1
- Treat promptly with corticosteroids and short acting, inhaled $beta_2$-agonists
- Assess response to therapy using objective measures as well as clinical exam
- Discharge patient with appropriate education, written instructions, and follow-up

Telephone Triage:

- Assess the severity of the asthma exacerbation
- Patients with severe exacerbations should NOT be managed at home
- Review the patient's action plan and set up appropriate follow-up

Table A. Step-Care Approach for Prescribing Asthma Medications Based on Severity–Pediatric

Severity Level	Signs/Symptoms	Nocturnal Symptoms	Drug Therapy
Mild Intermittent (493.00x1)*	• Symptoms ≤ 2 times/week • Exacerbations brief • Asymptomatic/normal PEF between exacerbations	≤ 2 times/month	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Usually no daily medication needed
Mild Persistent (493.00x2)	• Symptoms > 2 times/week but < 1 time/day • Exacerbations can affect activity	> 2 times/month	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (LOW dose) • May also consider theophyline SR, leukotriene modifier, cromolyn, or nedocromil • For patients with ASA sensitive asthma, consider using leukotriene modifiers
Moderate Persistent (493.00x3)	• Symptoms daily • Exacerbations ≥ 2 times/week and affect activity • Daily use of quick relief medications	> 1 time/week	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (MEDIUM dose) *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and inhaled long-acting beta$_2$-agonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (LOW–MEDIUM dose) and theophyline • Consider referral
Severe Persistent (493.00x4)	• Symptoms continuous • Limited physical activity • Exacerbations frequent	Frequent	***Quick Relief*** • Inhaled short-acting beta$_2$-agonist PRN ***Long-Term Control*** • Inhaled corticosteroid (HIGH dose) and inhaled long-acting beta$_2$-agonist *or* • Inhaled corticosteroid (HIGH dose) and leukotriene receptor antagonist *or* • Inhaled corticosteroid (HIGH dose) and theophyline • Oral corticosteroids may be indicated • Consider referral
(493.11)	Asthma with status asthmaticus		

** ICD-9 Code/MEDCOM Asthma Extender Code*

PROVIDER REFERENCE CARD

MEDICATION TABLE–PEDIATRIC (Children Under 6 Years Old Who Cannot Perform Spirometry)

Estimated Comparative Daily Dosages for Inhaled Corticosteroids

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1p) Page 10; Management of Asthma: Annotations (A2p) Page 14

Drug	Low-Dose	Medium-Dose	High-Dose
Beclomethasone dipropionate 42 mcg/puff 84 mcg/puff	84 - 336 mcg 2 - 8 puffs 1 - 4 puffs	336 - 672 mcg 8 - 16 puffs 4 - 8 puffs	> 672 mcg > 16 puffs > 8 puffs
Budesonide Turbuhaler	100 - 200 mcg 1 inhalation	200 - 400 mcg 1 - 2 inhalations	> 400 mcg > 2 inhalations
Flunisolide 250 mcg/puff	500 - 750 mcg 2 - 3 puffs	750 - 1250 mcg 4 - 5 puffs	1250 mcg > 5 puffs
Fluticasone MDI: 44, 110, 220 mcg/puff DPI: (dried powder inhaler): 50, 100, 250 mcg/puff	88 - 176 mcg	176 - 440 mcg	> 440 mcg
Triamcinolone Acetonide 100 mcg/puff	400 - 800 mcg 4 - 8 puffs	800 - 1200 mcg 8 - 12 puffs	1200 mcg > 12 puffs

TABLE: Leukotriene Modifiers

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A1a) Page 16

Drug	Dosage Form	Dose	Age Approval Use
Montelukast	4 mg chewable tablet	Children (2 - 5 yrs) 4 mg qhs	≥ 2 yrs

MEDICATION TABLE–PEDIATRIC (Children Under 6 Years Old Who Cannot Perform Spirometry) cont.

Medications Doses (Adapted from the NAEPP EPR - 2 1997)

DoD/VA Asthma Clinical Practice Guideline–
Management of Asthma: Annotations (A3p) Page 7

Medications	Children's Dose	Comments
Inhaled short-acting beta$_2$-agonists		
Albuterol: MDI (90 mcg/puff) with spacer/holding chamber	4 to 8 puffs every 20 minutes x 3 doses then 1 - 4 hours as necessary	As effective as nebulized therapy if patient is able to coordinate inhalation maneuver
Nebulizer solution: (5 mg/ml)	0.15 mg/kg (minimum dose 2.5 -5.0 mg) every 20 minutes for 3 doses, then 0.15 - 0.3 mg/kg up to 10 mg every 1 - 4 hours when necessary or up to 0.5 mg/kg/hr continuously by nebulizer	Only selective beta$_2$-agonists are recommended. For optimal delivery, dilute aerosols to minimum of 4 ml at gas flow of 6 to 8 L/minute
Systemic (subcutaneous) beta-agonists		
Epinephrine: 1:1000 (1 mg/ml)	0.01 mg/kg up to 0.3 - 0.5 mg every 30 minutes x 3 doses subcutaneously	No proven advantage of systemic therapy over aerosol. May be hazardous in patients with coronary artery disease.
Terbutaline (1mg/ml)	0.01 mg/kg SQ every 20 minutes x 3 doses, q 2-6 hr prn	
Anticholinergics		
Ipratropium bromide: MDI (18 mcg/puff)	4 - 8 puffs as necessary	Dose delivered from MDI is low and has not been studied in asthma exacerbations.
Nebulizer solution: (0.25 mg/ml; 0.5 mg/vial)	0.25 - 0.5 mg every 20 minutes x 3 doses then every 2 to 6 hours	May mix in same nebulizer with albuterol. Should not be used as first line therapy; may be added to beta$_2$-agonist therapy.
Corticosteroids **Prednisone** **Methylprednisolone** **Prednisolone**	1 mg/kg every 6 hours x 48 hours, then 1 - 2 mg/kg/day with maximum of 60 mg/day For outpatient "burst": 2 mg/kg/day Maximum 60 mg/day x 3 - 10 days	For outpatient "burst," use 20 - 60 mg/day (approximately 2 mg/kg/day) in single or two divided doses for 3 - 10 days (See Discussion)

Proposed Asthma Metrics

Percentage of asthma visits with documented asthma severity level.

Percentage of patients with persistent asthma who are prescribed long-term controllers.

Percentage of patients with persistent asthma with written action plan documented in the past 12 months.